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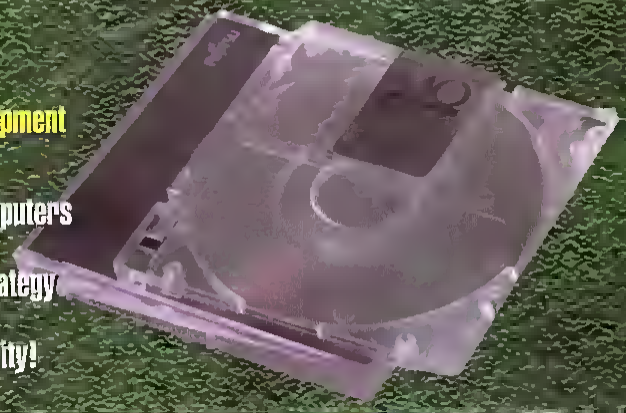

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Great Magazine!

I just wanted to let you know I think your magazine is great. I started receiving my subscription three months ago and have read every issue, cover to cover.

I would love to see your magazine expand and do some more articles directed towards consultants as well as VARs (I am an independent consultant). I find myself finishing the magazine in about an hour and wanting more.

Wilhelm Weinmann
Consultant, MCSE
Toit Rouge Consultations
St Hubert, Que.

What about the 2038 Bug?

Just 39 years after 2000 A.D., there'll be a computer bug to rival the current Y2K. The problem will arise largely due to the overwhelming popularity of the C and C++ computer languages — for Windows, Unix, and countless embedded systems; in fact, for any/all systems using a "signed 32-bit long integer" for time-keeping functions.

The C/C++ time-keeping library has a type of data-variable (time_t) that keeps track of the date and time as the total number of seconds which have transpired since Jan. 1, 1970, 00:00:00 GMT. A signed 32-bit integer can hold a maximum positive value of 2,147,483,647.

This corresponds to Tuesday, Jan. 19, 2038, at 03:14:07 GMT (about 8:14 a.m. EST, or 11:14 a.m. PST). When the time-variable is incremented beyond its positive maximum, it will "wrap around" to a very large negative value: -2,147,483,648. C/C++ time-functions translate this negative to a date in the past, sometimes with invalid values, such as Jan. -17, 1802.

So, Jan. 19, 2038 could launch millions of desktop and embedded systems back into 1901, or 1970 by default. Symptoms of a problem can include clocks running backwards!

The test code that I used to obtain the above results, on my Pentium Windows 95 system, is available on my Web page (*http://www.netcom.ca/~tclic*). It may be used to test C/C++ compilers on virtually any computing platform.

Ironically, most of the younger programmers and engineers — those now in their 20s, 30s and early 40s — who are currently working on Y2K, will also be around to witness Y2.038K.

Gregory S. Vigneault
Embedded Systems Developer
Toronto

Letters to the Editor

We welcome your letters on industry issues and concerns, as well as your comments on our magazine.

We reserve the right to edit your contributions for length or clarity.

Please write to The Editor, via e-mail at cow@tcp.ca or fax (604) 608-2688.

What We Really, Really Need...

If you step on an auto sales lot, the question "What kind of car do you want?" will be very quickly followed by "And how much would you like to spend?" In fact, price range is often asked about first, just to keep things in perspective. (Of course, the sales people are never amused by the response that really we want a Porsche, and we'd truly like to spend $1.)

However, the most crucial question is "What do you need?" In the car scenario, consider: How many passengers will you regularly carry? Do you need a lot of cargo space? Will you be driving over particularly rough terrain? Will you be towing a trailer? Those are just some of the questions crucial to getting a vehicle that will really met the needs of a particular buyer.

But let's talk computers. It used to be said: "*The PC you really want always costs $5,000.*" Depending on whom you ask, the cost of this dream machine may have dropped. But the point of the idiom was always: You can pay a lot of money for the ultimate computer, or you can settle for less, and pay less. But more to the point, ask: "How do you want to use this technology? What do you actually need to do?"

As an industry, we tend to get hung up on numerous philosophical issues. Why is Microsoft so big? Why aren't there more serious competitors? Which vendors sell direct? Who is 100 per cent committed to the channel? Why is software so bloaty? Which variant of Unix is technologically superior?

This issue, *CCW*'s Associate Editor Jeff Evans talks about how Network Computers, without becoming mainstream themselves, are deeply changing corporate computing ("*Whatever Works*," page 16.) In the past, we've talked a lot about NCs versus NetPCs, versus terminals, versus PCs — but truly: Who cares, as long as it works?

For the most part, customers' concerns are quite pragmatic. Here are five things that your clients require, particularly in business computing.

Your clients need:

1. Technology that will support the business goals of the organization.

If your customer presents you with a shopping list and budget, certainly you'll want to pay attention. But more pressingly, take the time to really listen to the needs and goals of the organization. If you can discover a better solution, especially at a lower cost, your client will be most appreciative of your extra effort.

2. Reliable products that work together seamlessly.

Most clients don't truly care whether their solution is derived from one or multiple vendors. But they want it all to work together very well, and don't want to hear about rival standards or conflicts.

3. One-stop support that's immediate and effective.

None of us really wants to hear about problems. But if you've got an eye to the future, you want to be the one your client calls for any technological issue. You may have to deal with multiple vendors and partners behind-the-scenes, but make sure your company is the main contact, both for support and purchasing matters. If you're not carrying "replacement" inventory, make sure you're dealing with manufacturers that will replace products overnight when warranty issues arise.

4. Technology that has room for growth as needs change and expand.

No matter what products your customers ask for, they'll expect compatibility and support even a few years down the line. Be forward-thinking and build a growth path for your clients. Present a plan on how current purchases can fit into a bigger picture, as needs and businesses change and grow.

5. To know you care.

This may seem trite, but it's actually the most important point of all. Of course you care, this is your business we're talking about! But your customers are first-most people, so deal with them as people who want respect and dedicated service. The "touchy-feely" stuff like birthday or Christmas cards plays a part. More importantly, let your clients know you're looking out for their interests. Be proactive. For example, let them know how their current computing environment can be adapted to accommodate an intranet or extranet for improved productivity.

The main point — Know your customers: their names, faces and needs, and work together, for mutual advantage. CCW

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INDUSTRY FLASH

HP Teams Up, for Internet Push

Looking to drive Internet-related business, Hewlett-Packard (Canada) Ltd (as part of a worldwide venture) has teamed up with a range of application and Internet services partners to launch a one-stop shop for resellers. Under the CoVision program, HP Canada is initially working with 14 application partners and 17 channel partners

Napolean Sansregret, channel development manager for HP Canada, said the company is looking for more partners "able to add substantial value for e-business solutions." Resellers meeting the criteria can expect a "time-to-market" advantage from access to the programs portfolio of Internet software and hardware, along with specialized marketing and training support, says HP

FireWire Support Primes Eurocom for Digital Video

Nepean, Ont.'s own Eurocom Corp. has taken FireWire portable, in the the Eurocom 8500P and the Eurocom 2100P

According to Eurocom, FireWire revolutionizes digital video transmission, improving video-editing and video-conferencing, for example. The port transmits digital video data at 400 MB/sec. The notebooks now have a standard connection to digital consumer electronics — from cameras to VCRs, says the company

The Eurocom 2100P has a 366MHz Pentium II processor and 8MB of SGRAM for video. The Eurocom 8500P has a 15.1-inch screen, a full-sized keyboard, an accelerated graphics port for improved video performance and 384MB of SDRAM

Pricing for the 8500P starts at $3,799. The 2100P starts at $3,299. See *http://www.eurocom.ca*.

Lacking Spark?

Vancouver's Energy Interface Corp. is shipping a "pen" it says will improve battery performance and reliability. The PowerPen applicator contains a liquid to remove oxides and prevent future build-up, says the company, recommending it for use with power packs and chargers for computer notebooks, camcorders and cell phones

Suggested retail price is US$4. See *http://www.powerpen.com*

It's Simple Biometrics...

Fingering an emerging market, Mississauga, Ont.-based distributor, Simple Technology Inc., has expanded its biometrics line of products

Biometrics is the science of interpreting individually unique human or animal physical characteristics such as fingerprint, voiceprint, face recognition, DNA, or retinal pattern, and using those features for "uncounterfeitable" personal identification. Included in the line are the Key Tronic SECURE Scanner Keyboard, with a fingerprint scanner built into the left edge of the keyboard; the Secure Scanner Mouse, with a fingerprint scanner built into the top of the mouse case; the Secure Desktop Scanner, a stand-alone fingerprint scanner; the new Digital Persona U.are.U fingerprint scanning system with a USB connection; and the SAFtyLatch SAF/nt software for the encryption of information on a local or network drive. See *http://www.simpletechnology.com/biometric.htm*.

SGI Move Acknowledges NT

After a year of rumors, Silicon Graphics Canada has now unveiled its new Windows NT-based visual workstations. And the Silicon Graphics 320 has up to two 450MHz Pentium II processors and up to 1GB of ECC SDRAM memory, plus the Cobalt Graphics chipset, high-speed memory and I/O interconnect. The base price starts at $5,495. A quad-processor model, the Silicon Graphics 540 visual workstation, is slated to ship in Q2. See *http://www.sgi.ca*

Nifty New Notebooks

Notebook mover and shaker, Toshiba of Canada, Information Systems Group, has undertaken a major refresh of its notebook PC product line

One of the most interesting of the new models is the Portege 7020CT, weighing just 4.1 pounds but offering a 366MHz Pentium II processor, a 6.4 GB drive, a 56Kbps modem, 128-bit graphics and up to 192MB of RAM. See *http://www.toshiba.ca*

Toshiba is the long-standing market leader in the notebook PC field, but has encountered major competition in the last two years from Compaq and IBM. The three leading notebook vendors account for nearly 70 per cent of Canadian notebook sales.

SDMS adds Intelligent Register

Vancouver-based Specialized Digital Micro Systems (SDMS) is now distributing Epson's Intelligent Register in Canada

The product, which starts at $1,549, is Pentium-based and includes a 10.4 inch 256 color LCD touch-screen monitor and USB ports for scanners, readers and other peripherals. The all-in-one design features a thermal or dot-matrix receipt printer and a credit card reader. The system can work in a stand-alone mode, or on a network. See *http://www.sdms.ca* (CW)

Triple Red Carpet Points? Are you guys crazy or what?

It sounds too good to be true: Every time you sell a Compaq Deskpro EP or EN, you'll earn triple points. But only until March 31*. To obtain a current 3x red Carpet Program Point Index or to register for the Red Carpet Rewards Program, call the Red Carpet Rewards Centre at 1-800-530-8091. Then take those triple points and redeem them for something special. Crazy but true.

COMPAQ Better answers.

CCW Picks Show Winners

• by Jeff Evans and Grace Casselman •

At Vancouver's Comdex/Canada West '99, seven worthy winners picked up the *Innovation 99* best-of-show awards, as decided by a panel of editors from *Canadian Computer Wholesaler* and Canada Computer Paper.

Those winners are:

- Panasonic Canada Inc.'s **Toughbook CF-27** ruggedized notebook with built-in wireless communications, starting at around $6,000.
- Pointe-Claire, Que.-based Protec Microsystems Inc.'s $225 **WebBeetle** device for Internet and fax/modem sharing through a single connection.
- Micro Solution Inc.'s **Backpack CD-Rewriter** 4X parallel-port-connected CD-RW, priced at $799.
- ViewSonic Corp.'s $1,909 digital pivoting **ViewPanel VPD150** LCD monitor, including an ATI digital graphics card.
- Vancouver-based Xing Xing Computer Graphics Inc.'s new **Lotus Spring** game software, displaying very impressive graphics.
- The **Linux** operating system, presented to the enthusiastic Vancouver Linux Users Group.
- The technology implementation and leadership in **Cellular Digital Packet Data** (CDPD) technology from BC Tel Mobility. The technology, known for its security, is in use with a wide variety of devices, including the Panasonic Toughbook CF-27 notebook, and Novatel's Minstrel Plus 19.2Kbps wireless modem, priced at $499.

The show, formerly known as Comdex/PacRim, occupied at least one-third less space than last year. Continuing a trend, the main PC hardware makers (Compaq, Dell, IBM and Apple) were conspicuously absent. A number of vendors, including Creative Labs and Lexmark, didn't participate on the show floor, but leveraged the event by hosting demo and hospitality suites in nearby hotels. Packard Bell NEC showed its newest line of desktop and notebook PCs to selected guests in a hotel suite. (A larger form-factor Windows CE machine called the MobilePro 800 H/PC features a 9.4-inch screen, a 56Kbps modem, and 10 hours of battery life, in a 2.5-pound package. It's priced at $1,599.)

Epson previewed its $999 PhotoPC 750Z megapixel digital camera, with 1,600 by 1,200 pixel resolution (using HyPict image enhancement). It produces digital images with nearly two million pixels, suitable for many publishing, multimedia and Web applications. Quick initial tests by *CCW* staff revealed built-in picture optimization smarts on the 750Z, which allow extremely high-quality results even in low light and uneven lighting conditions.

Tektronix announced a new, more flexible 'open sourcing' product supply policy for resellers. In the expectation that its new printer line will continue to accelerate in sales, Tektronix is relaxing the requirement for pre-approved orders before shipping products to authorized resellers. According to Rich McBee, the recently appointed general manager of Tektronix Canada, "The new sourcing structure improves product availability, gives our reseller partners more choice in developing their preferred sourcing relationship, and allows Tektronix to continue to commit its resources to developing product solutions to meet business and customer needs."

A new wave of absolutely flat CRT monitors was in evidence at the show. Viewsonic, for example, announced its $1,639 PT795 PerfectFlat 19-inch monitor, which features up to 1,920 by 1,440 resolution, and has four USB accessory ports.

Optiquest announced the L700 15.1-inch flat-panel LCD display that features resolutions of up to 1,024 by 768, priced at $1,529.

At a private reception, Adobe Canada gave resellers a chance to touch a new Apple G3 computer. Adobe reps lavishly praised Adobe's resellers and business partners for their role in helping Adobe Canada's revenues to grow rapidly throughout 1998.

Winnipeg-based distributor, Pro-Data Inc., hosted the VI-5500 "visual computing solution" from Edmonton-based Chentronics Inc. The package includes a 42-inch Fujitsu 42 flat-panel plasma display outfitted with touch-screen technology, DVD, CD-R, broadcast and video-conferencing technologies. The product, which lists for $35,000, is aimed at corporate boardroom presentations and training applications.

Ottawa-based Cognos announced a deployment option for its PowerPlay 6.5 Enterprise Server called PowerPlay for Microsoft Excel. The on-line analytical processing application can support Web, Windows, spreadsheet and mobile users from a single, centrally managed server. With an Excel add-in, users can do OLAP report authoring using the function and calculation features of Excel. CCW

Jeff Evans is Associate Editor and Grace Casselman is Editor of Canadian Computer Wholesaler.

Studioworks

Enjoy the View

The New LG Studioworks 15", 17" & 19" Monitors

Designed for mainstream business & home office applications, the new trio of LG Studioworks monitors delivers sharper, crisper pictures and comes with a range of advanced features, including on-screen digital microprocessor controls, special screen coating, high resolution, and high refresh rate. For real performance, at a more affordable price, choose monitors from a world leader. LG

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Column

CDPD Wireless Set to Take Flight

by David Tanaka

It was impressive! There I was, standing in the middle of a trade show floor, watching Demo Guy surfing the Web on a Palm Pilot.

Before you say "ho-hum," here's the very cool part — no wires.

Novatel Wireless Inc.'s Minstrel was the secret. It's a wireless 19.2Kbps modem into which a Palm unit slides. That adds another third to the Palm's length, and a bit to its thickness. But with it, you can e-mail, surf the Web and fax, all without the need to connect to a land line. It comes with a text-based Web browser as well as a POP3-compliant e-mail client.

The unit, shown by Calgary's Tac Mobility, a business partner of BC Tel/Telus Mobility, uses a Cellular Digital Packet Data (CDPD) data transmission service. BC Tel Mobility is arguably the country's leader in CDPD. For example, in 1996, the Delta Police force, in the BC Lower Mainland, became the first police force in Canada to use CDPD-based dispatch system — through a partnership with BC Tel Mobility. According to BC Tel Mobility, CDPD allows the Delta police to access local, provincial and national police files from a portable computer equipped with a wireless CDPD modem. This is much quicker than the traditional method of a series of radio conversations with the dispatcher.

CDPD offers high levels of security through encryption, relatively fast data transmission, and support for TCP/IP network protocols. Support for TCP/IP is what allowed the Minstrel to give the Palm wireless Web browsing. CDPD isn't the only wireless data technology, but to my mind, it's where the future lies.

Two other systems have had wider availability. Mobitex, which is being offered by Cantel AT&T and Ardis, available from Bell Mobility. Last year, I had an opportunity to test a wireless e-mail system from Bell Mobility and its business partners, (Ikon supplied the Ardis service, and Motorola supplied the wireless data modem). I recall sitting in the lobby of the Calgary Convention Centre, sending and receiving e-mail from my Windows CE handheld with nary a phone jack in sight. No dial-up was necessary — it was like being on a LAN, but with no wires.

However convenient they can be, both Mobitex and Ardis are proprietary messaging networks, so in order to use them, you have to subscribe to the e-mail service. Interestingly, 3Com's wireless Palm VII is using the Mobitex network for now. Both Mobitex and Ardis presently have the advantage of being available in more areas of the country. However, CDPD, being IP-based, has a greater potential to exploit the 'Net and all the data access potential it holds for remote computing.

Initial hardware costs to go wireless with CDPD range from $500 to $1,000. For example, the Minstrel sells for approximately $500. Then there's a monthly subscription fee, which can range from approximately $30 per month and up, depending on the airtime package.

Interest in CDPD seems to be growing. Sierra Wireless recently introduced the AirCard CE. The AirCard offers Windows CE handheld users the same kind of wireless Web access potential that the Minstrel offers Palm users. Panasonic is also pursuing wireless mobile computing, and its ToughBook 27 notebook computer includes built-in support for wireless communications including Ardis and CDPD.

Internet technologies have quickly become part of the business solution for distributed network access. IP-based intranets offer the reach of a wide-area network without the infrastructure costs. Wireless IP-based solutions will help to extent the corporation even further.

This seems like a potential opportunity for VARs and consultants who already offer intranet or Web-enabled database services. If we look at the evolution of the telephone, we see the freedom from wires had a big impact on the way people used them. Seeing people having cellular phone conversations on the street is now so mundane we don't even notice. We know that if we need to make a phone call, we can just do it without seeking out a special booth.

Likewise, in a wireless world, data access will become immediate, and immediate access will be expected.

Sales or support people in the field will have ready access to information residing on a company's intranet. Dispatchers can immediately get new routing information or priorities. And if employees away from the office need to know something, they'll just flip open their Palm and surf to the corporate intranet.

Web Sites

Novatel Wireless *http://www.novatelwireless.com*
BC Tel Mobility *http://www.bctm.com*
Sierra Wireless *http://www.sierrawireless.com*
Panasonic *http://www.panasonic.com*

David Tanaka is a regular columnist for Canadian Computer Wholesaler. He is also Editor of The Computer Paper and can be reached at david_tanaka@tcp.ca.

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Column

Nortel/Bay

Creates Services with Distinction

by Dan McLean

Nortel has offered a glimpse of a new unified services strategy for worldwide customers. It's designed to, among other things, draw a clear line in the sand around where Nortel/Bay and its services partners will be appropriately occupied in a wide range of service engagements. (The merger between Nortel and Bay Networks was completed on Aug. 31, 1998.)

The end result should be extremely positive, although there are still key considerations to be resolved. Conflicts (where vendor and service partners compete directly for service business) have been a long-standing problem not just for Bay, but for many purveyors of IT hardware. The lack of a consistent selling strategy and well-defined market segmentation means services opportunities are frequently considered "available for bid" by equipment vendor and channel partners alike. This competitive situation often results in the vendor, business partner and, ultimately, the customer being at odds with each other.

Nortel hopes to clear up confusion and potential acrimony through a services operating model (to be officially unveiled this month), that provides a more clearly defined delivery road map. It includes a "Named Account" service program for its direct enterprise customers and a "Business Partner" service program for the channel.

The former Bay Networks crafted strong partnerships in the Canadian channel, particularly during the past two years. Bay has steadily increased market share in Canada, primarily because of effective relationships with network integrators and other service companies. In fact, the Canadian operation has actively promoted a channel method of engagement with clients and does less direct business in Canada than might typically be done in other regions.

Bay currently boasts hundreds of non-authorized resellers involved in post-sales services, including remedial break/fix, professional services and education services. Even more are involved in pre-sales services. But Canada has long been Cisco-country when it comes to both the buyers of network equipment and in terms of network product preference expressed in channel relationships.

Cisco Systems Inc. established its territorial mark early in Canada, first with the country's telcos — typically the largest network services providers, both in terms of the scope of these services and the volume of data network equipment they sell — then with large systems and network integrators. The challenge for the likes of Bay Networks, 3Com Corp. and Cabletron Systems has always been to scramble for the remaining business.

With its deep entrenchment among the country's largest and most important resellers, Cisco has made life miserable for competitors who look to establish equally strong relationships with Canadian resellers.

Will Nortel/Bay's redefined strategy around services and support force a radical change in the Canadian model? Probably not. But it may be a solid foundation to future programs and strategies that could gradually peck away at Cisco's monolithic strength in the Canadian channel. Based on what has been revealed, the company has built an attractive platform for partnering. At the very least, Nortel resellers of Bay equipment should have a clear understanding of what business will come their way.

How effectively can Nortel transition its customer accounts to the new service model? And can the company convince partners to invest in its certification training in a big way, and by extension, encourage more aggressive marketing of the Bay product line?

Nortel, when it first unveiled the new services strategy to International Data Corp. (Canada) Ltd. in November, vowed it would not take business away from partners in transitioning key customers to an elite group it calls Named Accounts — strategic clients that will be serviced through Bay/Nortel's direct service arm. (However, this position is not carved in granite, judging by comments made by an official with Bay Networks Canada Inc., who explained that this is certainly the goal, but it's still too early to tell whether this will absolutely be the case until the entire strategy is rolled out.) And note this potential conflict: another aim of the redefined services strategy is to see Nortel grow its Bay Networks Named Account base to 500 accounts, significantly higher than the current Named Account base.

Nortel is looking to significantly beef up its partner certifications, ultimately to create higher level expertise and stronger brand awareness. But the Nortel effort parallels the stringent certification requirements of Cisco and may work against the company.

Some may find that a similar investment in Cisco certification may be more appealing, given that investment in Cisco expertise conceivably drives more business. Nortel/Bay is offering to significantly subsidize training, but may need to sweeten the deal in Canada by offering even deeper training discounts.

Still, the Nortel brand awareness should have an impact. Bay stands to be a much more prominent company in Canada through its merger with Nortel, given that Canadians are very familiar with Nortel as a company. Canadians generally may be more apt to see the upside of the Nortel/Bay combination and, by extension, resellers and other partners here could be much more willing to enhance their relationships with the duo. ☒

Dan McLean is research manager of network support and integration services research for International Data Corp. (Canada) Ltd. in Toronto. He can be reached at dmclean@idccanada.com

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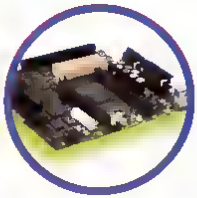

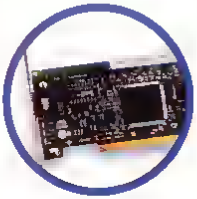

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Column

Onward and Upward?

Apple Performs Marketing Wizardry at MacWorld Expo

by Jeff Evans

In his keynote speech at MacWorld Expo in San Francisco, Apple Computer Inc founder and perpetual interim CEO, Steve Jobs, kicked off Apple's campaign to make 1999 even better than 1998. Indeed, last year saw a stunning turnaround in Apple's fortunes, as the company experienced a runaway success with the iMac computer, expanded retail channel partnerships, back-to-back profitable quarters, and even a vote of confidence by former arch-foe Bill Gates.

Apple's iMac

And Now for the Next Trick...

With world technology media focused on the 1999 MacWorld Expo, Jobs had a huge opportunity to sing about a reinvigorated Apple — to the investment community, the channel and millions of potential customers. Making the most of his moment in the spotlight, Jobs unveiled a new line of Macintosh G3 desktop computers aimed at the mid- to high-end of the computing market. Borrowing some design elements from the iMac, the new G3's combine translucent plastic external casework with power-user technology inside. Apple claims it will deliver more than twice the processing performance for its top of the line G3, compared to the fastest 450MHz Pentium-based Windows PCs currently on the market. The new G3s have the latest ATI Rage 128 3D graphics hardware, a 400Mbps FireWire port, a pair of USB ports and a 100Mbps Ethernet port. Apple claims the new G3s are expandable up to 1GB of RAM and 100GB of hard drive capacity. The expandability is aided by dynamic devices driver configuration and intelligent plug-and-play technology.

Apple's G3

Third-party support was in ample evidence with the new product rollout, including a sophisticated new version of Microsoft Internet Explorer (Version 4.5), a Sony Playstation emulator, which if it works as advertised, would serve to instantly beef up the lacklustre Mac games library by hundreds of leading-edge Playstation titles.

Apple can fairly claim to have the world's best desktop computers as 1999 begins. This is likely to translate into continued strong sales and probably continued profitability through the rest of the year.

Yet no matter how well Apple does in its proprietary Macintosh sandbox, it will have a very hard time as it butts heads with the Wintel behemoth trying to increase its global market-share to anything like the 12 to 15 per cent level it enjoyed a decade ago. If Apple wants to go from modest to rapid growth, it will have to pull world-beating technology out of its hat, in areas where opportunities for rapid growth are the greatest — electronic commerce, handheld and mobile computing, digital video, speech recognition and high-speed low-cost networked computing.

Nevertheless, the applause for Jobs' performance, both at MacWorld Expo and over the last 18 months, was genuine. Moreover, it's being expressed by many in the industry — far beyond the traditional hard core Mac devotees. CCW

Jeff Evans is Associate Editor of Canadian Computer Wholesaler. He can be reached at jeff_evans@tcp.ca

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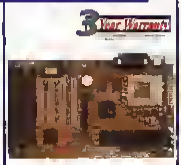

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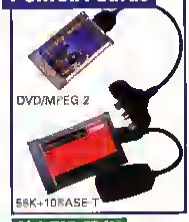

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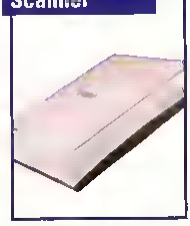

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Whatever Works

by Jeff Evans

The Network Computer is Changing Computing More Radically than Indicated by Modest Sales of Official NCs

At Toronto's Internet World in February, I stopped off in the media centre to type up some short articles and e-mail them to the editor. Instead of the usual PCs, there were little black IBM network computers (NCs) on each desktop.

I sat down in front of one, pulled a floppy disk out of my pocket, then noticed that these NCs didn't have any floppy drives. I opened the Web browser and was confronted with a demand for a password. There was a scrap of paper taped to the monitor with the default password written on it, so I was able to type the password in and be recognized by the system as a legitimate user. However, when I tried to open the browser's e-mail program to type and send my notes, a screen message popped up saying that an e-mail account needed to be set up for me. I looked for a tech support person in vain. After about 20 minutes of futzing around trying to get the thing to work, I conceded defeat and took a streetcar to my office to a personal computer running Microsoft Word, equipped with a floppy drive and e-mail.

And so, as I sat down to write this article on network computing, I had some first hand understanding of why the network computer so far has had only modest success in the real world.

The Vision Thing

In 1994, Oracle Corp. founder and CEO Larry Ellison announced the "Five Hundred Dollar Computer" — a smart re-working of the old "dumb" network terminal that had been the industry norm before the advent of the PC. This new approach would change the paradigm of computing as profoundly as the emergence of the personal computer had done in the late '70s and early '80s, Ellison said. Ellison showed off a mock-up of a prototype of this Network Computer, or NC. It would be a powerful little box without a hard drive or a floppy drive, attached to a network server, which would download applications to the NC as needed, and store files created and modified by the user. Unlike a traditional terminal, the NC would have its own local processor, graphics and even sound chips. This would reduce the demand on the computation resources of the server (a major bottleneck in the old mainframe/terminal computing days), while preserving centralized control over security, software management and data storage.

The Database is the Computer

The stand alone PC, with its expensive-to-manage local hard drive and flaky PC software, was simply a bad idea. Rather, the hundreds of millions of future NC users would depend on large centralized servers that would offer cheap, reliable access to vast databases of information and software applications. The network computing business model would halt the skyrocketing costs of client/server computing. It would humble the Microsoft monopoly on the desktop, by offering a superior solution to the Microsoft Windows platform. It would allow computing to become much more pervasive around the world, by making it affordable.

When Sun Microsystems launched the Java programming language, Java and the NC seemed to be a marriage made in heaven. Running Java software downloaded from servers, NCs would displace Windows PCs in much of the corporate computing market.

Canada's Corel Corp. became an early convert to the Java/NC model. Corel's founder and CEO announced that he was betting the farm on Java and network computing. Corel was poised for "hypergrowth," he claimed, as he showed off graphs and charts indicating that sales of NC/Java computer seats would outnumber sales of new Windows PCs within a few years.

Reality Check: The Legion of Bill Haters

Over the half decade since Ellison's announcement, the classical Network Computer — a sealed, diskless network information appliance — has had only a modest impact on the market in terms of sales. Long-time terminal vendors such as Wyse can point to a reasonable upgrade market from old dumb terminals to its smarter, more multimedia capable terminals. The bottom line, however, is that the NC is a bit player in terms of market share.

Ellison, perhaps inadvertently, has played a crucial role in directing the evolution of the Windows PC, by the sheer force of his personal animosity towards Bill Gates and Microsoft Windows. The new paradigm of network computing formulated by Ellison's database-centric computing, Sun

Microsystems's Java and Netscape's Navigator browser presented a mortal threat to Microsoft's Windows PC platform As Samuel Johnson once said, the knowledge that one is to be hung in the morning concentrates the mind wonderfully Bill got Larry's message, and has been working nonstop ever since to make Windows the network computing platform Gates turned Microsoft around 180 degrees almost overnight, to re-work the economics and the technology of the Windows PC so that it could dominate the Internet Age in the face of competition from network computing

As Ellison himself said at the Oracle OpenWorld conference in San Francisco in November, any Windows PC running a Web browser and connected to an intranet, extranet or the Web, is a network computer while it is connected An inefficient, expensive and complicated network computer to be sure, but an NC nonetheless

It Ain't Over Til it's Over

Ellison believes in a world where every personal information device, whether a smart pager, or digital cell phone, Palm Pilot, notebook or desktop PC, is connected to vastly powerful server computers running powerful databases

As network computing increasingly becomes the way all computing is done, all computer users will benefit from Larry Ellison's competition with Bill Gates And who cares who wins, as long as it works? CW

Jeff Evans is Associate Editor of Canadian Computer Wholesaler Based in Toronto, he can be reached at jeff_evans@icp.ca

Some Players:

Corel Corp./Hardware Canada Computing (*http://www.corel.ca*)
The prospect of riding the anticipated NC wave motivated Corel to ditch its longstanding close relationship with Microsoft and become a Larry Ellison style mortal competitor to Bill Gates Unfortunately, Corel's decision to acquire WordPerfect to beat Microsoft in the office software suite market, and its attempts to create world-beating Java business software, server solutions, video-conferencing products, and a network computer hardware line all came to naught in terms of creating "hypergrowth " The innovative and impressive Corel Computer NetWinder product has been sold to Ottawa based Hardware Canada Computing, in exchange for a 25 per cent equity stake in HCC by Corel Ever hopeful, Corel founder and CEO Michael Cowpland stated, "We believe the NetWinder family will experience tremendous success from Hardware Canada Computing's status as one of Canada's largest VARs and its experience in the SPARC/Unix space Corel will continue to benefit from HCC's success through our ownership position while at the same time, continuing to further focus efforts on our core software Business and our two flagship brands WordPerfect and CorelDraw "

IBM Corp (*http://www.ibm.com/nc*)
IBM, the historic world leader in mainframe/terminal computing, was an early convert to the network computing initiative The company "did more in 1997 to advance the NC concept" than any other computer vendor according to an International Data Corp consultant Be that as it may, although IBM has sold significant numbers of its Network Station NCs, the NC remains a very small part of IBM's sales compared to Windows notebook or desktop PCs or RISC-based Unix workstations. In April 1998, IBM's Series 100 Network Station began selling for a price as low as US$499
In mid-1998 IBM began to market the 3Com Palm Pilot handheld PC to its corporate customers giving further credibility to the Palm Pilot's potential as an ultraportable networked info device

Microsoft Corp (*http://www.microsoft.com*)
Microsoft, with several hundred million licensed (and unlicensed) users of its operating system and applications software worldwide, has won the war for the desktop, at least for now With its slimmed-down Windows CE operating system it wants to own the ultra-portable handheld computing market Though the market preference for the 3Com Palm line indicates some improvements to CE are needed) With the Windows Terminal Server it is aiming at the thin client market, with considerable corporate interest being shown even in the early stages of this product's release Windows NT Server is the largest selling server operating system, in terms of number of new licenses sold in 1998 The Microsoft SQL Server database is the largest volume database server, in terms of numbers of licenses (Oracle sells fewer copies of its database software, but for much higher total revenue, and on many platforms, including NT) Barring a catastrophic final judgement in the anti-trust cases going on against it, Microsoft seems destined to grab an ever-larger chunk of the network computing future In the process, the traditional desktop PC may change radically or vanish, replaced by new network computing form factors that are portable, wearable or embedded in cars, furniture or consumer electronics appliances

NCD (*http://www.ncd.com*)
Originally founded to help make Oracle Corp and Sun Microsystems's vision of network computing a physical reality Network Computing Devices has been spun off as an independent enterprise tasked with developing and promoting network computing (NC) devices in the corporate market

Oracle Corp (*http://www.oracle.com*)
Oracle, originally specializing in immensely expensive state of the-art database products only the largest corporations and best-funded intelligence agencies and military organizations could afford, has since become the market leader in general database solutions CEO Larry Ellison claims that the future belongs to the big, efficient database server, while the proliferation of little Microsoft NT servers is simply "a bad idea " Oracle is realistic enough to admit that Microsoft Windows NT is not going to go away, no matter how "inferior" it is to Unix, and so Oracle offers a Windows NT version of its database, which is extremely popular and lucrative Oracle has also announced projects to develop database front-ends for both the 3Com Palm Pilot and Windows CE, which would serve to make both families of portable devices true network computers

Sun Microsystems (*http://www.sun.com/nc*)
Sun's CEO Scott McNealy has been one of the biggest boosters of the NC concept. Sun's forte is in high-powered network servers, and Ellison's vision of low-cost NCs connecting to powerful databases running on reliable, large-scale servers plays well with Sun's existing product lines and its hopes for future growth Sun faces a long-term challenge from Windows NT but the limitations in NT's current reliability, robustness, scaleability and security all point to years of continued success for Sun The company promotes Java/NC solutions such as automated kiosks, which allow for reliable, low cost information or sales "points of contact" for consumers

ThinApse Corp (*http://www.egsoln.com*)
Canada's ThinApse is a provider of connected business computing and telephone services The company offers Citrix WinFrame products, and "thin client" terminal devices from Wyse and NCD ThinApse has also brought the Wildfire voice-activated business telephone service into Canada — an innovative system that allows a subscriber to interact with a sophisticated business information system over the phone, using simple spoken commands

Wyse (*http://www.wyse.com*)
Wyse has adopted a pragmatic approach to network computing The company, which sold vast numbers of dumb terminals in the days before Java and the World Wide Web, believes in making products on the basis of market demand rather than tech-sectarian dogma Hence Wyse offers a wide array of terminal products, from general purpose dumb terminals to the Winterm Thin Clients The Winterm Thin Client line is a range of Windows-based terminals, which provide low cost diskless Windows clients based on a Windows NT server Wyse claims much lower cost of ownership per end-user seat, while also offering access to the familiar Microsoft Windows user interface and applications The new Bellagio casino in Las Vegas has deployed hundreds of Wyse Winterms for example The new Winterm 3000 series takes advantage of the latest Windows NT v 4.0 Terminal Server Edition to run compact Windows CE applications

Removable Storage

The Logical Alternative

by Sean Carruthers

A lack of space is one of the biggest problems encountered by computer users.

It's easy to see why. For starters, software is getting progressively larger and people are downloading more software applications from the Internet. A 1GB hard drive was a very impressive device a couple of years ago, but when Windows 98 itself can eat up over a third of that all by itself, space gets tight for other applications on the drive.

While one solution to the problem is simply a larger hard drive, another option that's gaining popularity is large capacity removable storage. Inmega's Zip drive has become popular enough at this point for the Zip name to achieve the same generic status as Aspirin or Kleenex. Still, a large variety of alternative removable storage media are available in numerous formats.

When a customer is looking for a removable storage solution, find out about the system environment in which it would be used. For example, a user who has a system already packed with hard drives and other components on the IDE chain may not be able to make use of some of the options without sacrificing another component in their system. Similarly, users with no SCSI card and no slots left on the motherboard may not be able to get other devices working.

Although they're convenient for users who don't have a SCSI card or don't want to spring for the extra expense of the card, parallel-port devices may be problematic for users with printers not supporting port-sharing, and could also be difficult to configure under NT. (Many users report severe problems trying to use parallel port devices under Windows NT, including regular system crashes, disruption of the SCSI chain, and the inability to restart the system at all. NT users may want to avoid parallel port devices altogether unless their knowledge of the OS is advanced.)

For testing this month, we installed each of the drives on our test system, which was a 300MHz Pentium II system with 64MB RAM. During testing, we checked ease of installation under both Windows 98 and Windows NT Workstation 4.0, and tested write speeds for both large files and large directories. The large file was a single 72MB file, and the large directory was the same size but composed of 476 smaller files.

(We noticed during the tests: When we created the large test directory, we copied files into the folder in smaller batches [a bit from here, and a bit from there]. When the files were copied to the removable media as "loose" files, the copy operation would choke partway through, but they would copy correctly when copied to the media as a complete folder. The reason? When trying to copy the files as a loose batch, Windows would move them alphabetically, and would essentially trip over its own feet trying to get them into order for copying. [Imagine throwing a deck of cards down and then trying to pick them back up at a rate of one per second. In order.] When moved as a complete folder, the system would simply move them to the removable media in the order they were initially saved into the folder, regardless of alphabetical order. Because of the higher capacities involved with these types of removable media, it's a problem that users may run into for the first time, and worth keeping in mind.)

But what about CDs?

The compact disc has become one of the most popular forms of storage media for both music and data, and over the last few years, users' ability to make their own CDs has increased greatly.

Compact Disc Recordable (more commonly known as CD-R) entered the market with a stiff price tag, and tended to be used strictly by more high-end users. As always happens with technology, though, the price has dropped to the point where it is now affordable by a wider variety of users.

Discs that are "burned" on a CD-R drive certainly qualify as "removable," but they lack the flexibility of other removable storage in that they can be written to once only. On the other hand, the compatibility with most standard CD players is an attractive selling point. The low cost of the media is also attractive. After all, if the first disc wasn't quite what you wanted, it only costs another two dollars to do it again (compare that with the price of some of the rewriteable media, and it's certainly a deal, in the short term, at least).

And there's always Compact Disc ReWriteable (more commonly CD-RW). Although both the technology and the media is more expensive (between $20 and $30 apiece for the blank discs), the user is free to go back and change things previously written to the disc. Unfortunately, this is at the expense of a bit of compatibility. Although some standard CD drives will read discs written on CD-RW, the number is far fewer than with CD-R.

The proposed levy on recordable media (see *http://www.tcp.ca/gsb/reviews/storage/cdr_Q199.html* for more information) will re-balance the cost equation between CD-R and CD-RW, if it goes through. The levy would add $2.50 to the cost of each disc (sometimes more than the media itself), and would make the CD-R less attractive.

When compared to some of the other removable storage technologies out there, the hardware cost of writeable CDs may seem a bit steep at first. The fact that someone else can use the media with a standard CD-ROM drive may well be worth the extra cost.

Fujitsu DynaMO 640 SE

Suggested Retail Price: $650
Estimated Cost of Media: $60

When it comes to storage most know Fujitsu as a leader in hard drive and tape technology In addition Fujitsu is also the leader in magneto-optical technology, with MO drives for notebook computers and for the consumer desktop We had a chance to look at one of the desktop units

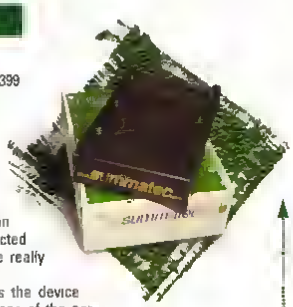
The DynaMO 640, with 640MB of space, is the external version of the M2513 drive, with a stylish curvy black case and an UltraSCSI connection When attached to an existing SCSI chain, both Windows 98 and Windows NT recognize the drive immediately This allows the user to start writing to the drive almost immediately

Write time was relatively speedy, both Windows 98 and Windows NT were able to transfer the 72MB file to the media in 2 10 minutes consistently Large directory transfers took a little bit longer, with Windows 98 transferring all files in just over 3.30 minutes Windows NT managed to do the same in just over three minutes

Overall, the DynaMO is easy to use, provides quick rewriteable storage, and looks good on the desktop, to boot.

Summatec MobileDrive and Station

Suggested Retail Price US$149 station
Estimated Cost of Media* US$249 (2GB), US$399 (4GB), US$599 (6GB), US$999 (8GB)
Combined Cost: Add US$100 to price of media, and the station is included.



The MobileDrive is a bit of a different beast from the rest of the items looked at this month, as it is essentially hard drive technology, but set up to be ejectable The MobileDrive station is installed in one of the full sized bays and connected to the IDE chain Large "cartridges," which are really hard drives, are inserted into the station

This setup has several advantages First, as the device resides on the IDE chain, users can boot from one of the cartridges like they would a regular hard drive Better however, is the ability to eject a disk with one operating system and reboot with a cartridge containing a different operating system For family members using the same computer or multiple users in an office environment, individual cartridges are good for keeping work seperated from play, or keeping confidential work private

The second major advantage is speed Internal hard drives are very fast, and because these are essentially the same thing, speed is comparable Windows 98 transferred the 72MB test file in only 20 seconds and the 72MB directory only took 32 seconds File transfer under Windows NT took longer, with the file taking 45 seconds, and the directory taking one minute The speed makes it possible for the users to run applications from the MobileDrive without bottlenecking — even games!

The third advantage with this system is that the cartridge size isn't limited by the write mechanism, because the write mechanism is contained in the cartridge instead of the docking station This allows the user to upgrade to larger hard drives as the technology becomes available, without having to buy a new dock Currently, cartridge sizes go up to 8GB

The downsides Because the cartridges are self contained hard drives the pricing on them is more expensive than with removable media that include the disk only And the docking station demands to be the master on the IDE chain it's on, possibly meaning major system reconfiguration to accommodate it.

In the end though, users looking for an ultra-fast solution with extra-high capacity needn't look further than this

Imation SuperDisk LS-120 2X

Suggested Retail Price: TBA
Estimated Cost of Media: $24.99, $149.99 for a 10-pack

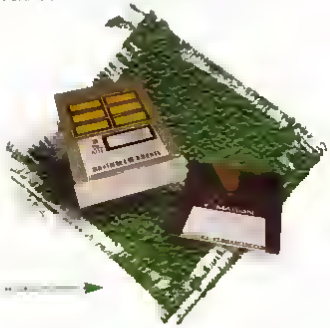
When it comes to popularity, the LS-120 drive is right up there, for a few reasons. The LS-120 technology was jointly developed by a group of different companies, including Imation, Compaq and Panasonic The 120 in the name refers to the number of megabytes each disk can hold — 120MB The LS portion stands for "laser servo," a technology that allows the drive to fit all 120MB onto a disk that is exactly the same size as the 1.44MB standard floppy disk. What's more, the LS 120 drive is backward-compatible with floppy disks

This design has allowed the LS 120 drive to be used as a replacement for the trusty floppy disk When the floppy drive is removed and the LS-120 installed, the LS-120 automatically defaults to the *A:* drive on a Windows system (if a floppy drive is still installed, the LS-120 will just as happily become *B:*) Both Windows 98 and Windows NT recognized the drive instantly and slotted it in to its proper place in the drive letter hierarchy without further configuration The one drawback to the internal LS-120 is that it resides on the IDE chain instead of the floppy chain and will take up a space that could be used for another hard drive or CD

This month, we tested the brand new double speed version of this technology The write speed was reasonably good, with the large file being committed to the media in roughly 3 15 minutes under Windows 98 and about 2 45 minutes when using Windows NT The drive wasn't so speedy with large batches of files taking 5 50 minutes under Windows 98, and 6 30 minutes under NT

As its able to replace the floppy drive (the user is able to boot from one of the 120 megabyte disks) the LS-120 makes a great overall choice for people looking for a high-capacity removable storage solution.

Note: At the time of writing, the unit we tested had not yet hit the market, and Imation had not settled on official pricing yet The older single speed version of the drive has an estimated street price of $169, and this new one is expected to be slightly higher, but not by much For users that would rather have an external version of the drive, there is also a parallel version available ($179.99) and a USB version ($249.99 perfect for use with the iMac) There is also a PCMCIA version available



Iomega

Over the last number of years Iomega has made a huge name for itself in the removable storage game, first with the 100MB Zip disk, followed by the 1GB Jaz disk. Recently, Iomega has added a number of additions to the product line, and we had a chance to look at a few of them.

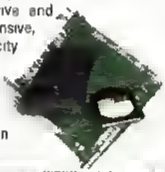
Iomega Jaz 2GB External

Estimated Street Price: $569
Estimated Cost of Media: $179 (2GB)
$139 (1GB)

The Jaz 2GB is a 2GB version of the Jaz drive, and is able to use both 2GB cartridges and the older 1GB cartridges. The drive has an Ultra SCSI connection and is also available in an internal version.

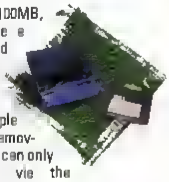
When attached to an existing SCSI chain, the drive is recognized instantly by both Windows 98 and NT and is available for both reading and writing. Write speed for the 72MB file was about 2:20 minutes under Windows 98, and an even speedier 1:35 minutes under NT. The large directory took slightly longer, at 2:40 minutes under Windows 98, and 2:35 minutes under NT. (We also tested the Jaz 2GB under Windows 98 with the optional Jaz Jet SCSI card, which sped things up substantially, writing the 72MB file in one minute flat, and the directory in 1:15 minutes.)

While both the drive and media are more expensive, the extra-large capacity and quick access time make this drive worth the extra investment, especially for users involved in multimedia production.



Iomega Zip 100 USB

Estimated street Price: $239
Estimated Cost of Media: $20 (or less)



The Zip 100, which holds 100MB, has been around for quite a while now in the SCSI and parallel port varieties. Now, the Zip 100 supports USB. This is presumably in answer to the release of the Apple iMac, which has no built-in removable storage of any kind, and can only accept new attachables via the Universal Serial Bus. Because of that, the USB version of the Zip drive comes in a color scheme consistent with the new Macintosh transparent blues.

Because of the use of USB, the write speed is somewhat quicker than with the older SCSI Zip. Under Windows 98, the 72MB test file was committed to disk in 2:40 minutes as opposed to the 3:20 minutes recorded with the SCSI version, and large directory transfer took 2:50 minutes instead of the SCSI's 3:40 minutes.

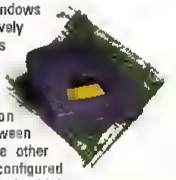
The downside? Because of the USB interface, initial detection of the drive isn't as easy as it would be on an existing SCSI chain. Still, getting the drive up and running is quite easy under both Windows 98 and the iMac, with the computer detecting the drive instantly but requiring the user to insert the driver disk. On the other hand, the drive is currently unusable under Windows NT because of NT's lack of USB support. This should be addressed when Windows 2000 is released. The other disappointing thing about this is the lack of a USB port on the rear of the drive for chaining other USB devices; the SCSI version of the Zip had a passthrough for attaching other devices.

The advantages for users of Windows 98 and the iMac should make up for these small complaints. The drive is fully compatible with older Zip 100 disks. Further, the use of the USB port makes it possible to connect and disconnect the drive on the fly, eliminating the need to reboot when switching the drive between machines.

Iomega Zip 250 Parallel

Estimated Street Price: $319
Estimated Cost of Media: $30 (subject to change)

Also newly available is the next generation of the Zip drive, upping the capacity from 100MB to 250MB. The new drive will also accept the older 100MB disks (and users worried that they might damage their older drives with the newer higher-capacity disks fear not: the older drives instantly eject the 250MB disks). We were able to look at the parallel version of the Zip 250, but a SCSI version is also available.



Installation under Windows 98 was quick and relatively easy. Windows NT was also fairly quick in the installation, but our test system had a number of configuration conflicts on subsequent boot-ups between the parallel port and the other SCSI devices previously configured. Users running under NT should lean towards the SCSI version of this device.

Write speed for the parallel device was also a bit on the slow side compared to the SCSI version. The 72MB file was committed to media in 7:05 minutes in Windows 98, and 8:50 minutes under NT. The large directory took slightly longer, at 7:20 minutes for both Windows 98 and Windows NT. This slower transfer time is essentially the result of the parallel port connection and users looking for more speed should look instead at the SCSI version. Its also reported that the SCSI Zip 250 turns in faster transfers than the older Zip 100, although we can't confirm that.

In general, the 250MB version of the Zip drive makes a worthy successor to the popular Zip 100. It's easy to use and backward-compatible with older Zip disks. Now you just have to choose between the speedier SCSI and the ubiquitous parallel port.

Panasonic

Everyone knows the name Panasonic, but many probably aren't aware just how often its components are included inside computer systems. Often labelled as Matsushita, Panasonic makes up a high percentage of the CD-ROM and DVD drives installed in systems from other companies.

Panasonic SuperDisk LS-120 2X

Suggested Retail Price: $175
Estimated Cost of Media: $24.99, $149.99 for a 10-pack

As one of the companies that jointly developed LS-120 technology, Panasonic is actually responsible for the manufacturing of the 120MB drives. Panasonic's double-speed drive is functionally identical to the Imation LS-120 drive reviewed above. Transfer speeds are the same, and the drive also has the same ease-of-use and installation.

Users looking for a high capacity solution that remains backward-compatible with floppies would also be well-served by the Panasonic SuperDisk.

Panasonic LF-D101 DVD-RAM

Suggested Retail Price: $1,149
Estimated Cost of Media: $59 for a 5.2GB cartridge, $39 for a 2.6GB cartridge

First out of the gate in the DVD-RAM field, Panasonic offers up the LF-D101 rewriteable DVD. The technology does not yet allow the user to fit a full 17GB of data onto a rewriteable DVD, with the discs currently topping out at 5.2GB (that's 2.6GB on each side of the disc). Nevertheless, 5.2GB of storage is plenty of space, and allows this media to provide a viable alternative to the more expensive higher capacity magneto optical.

The media for this particular drive ships inside cartridges. The 5.2GB disk is fixed inside the cartridge, but the 2.6GB cartridge can be opened up and the disc removed. Further, the innovative front-loading mechanism on the drive allows the user to insert the media in cartridges, or as a loose disc. As a reader, the drive is compatible with DVD-RDM, DVD video, CD, CD-R, CD-RW and PD discs.

At the time of review, drivers were available for Windows 95 and 98 but not NT, so write times were only tested in the Windows 98 environment. The 72MB file was committed to the media in 2:45 minutes and took 5:20 minutes to write the large directory.

After writing, the 2.6GB cartridge can be opened up and the media removed, but it's worth noting that most standard DVD-RDM drives are currently incapable of reading discs written on this drive. With the proper drivers, one of Panasonic's new 5X DVD-RDM drives is able to read these 2.6GB discs.

When you take into account both the speed and flexibility of the DVD-RAM drive, as far as reading other media, it's certainly an attractive device. The price tag may be a little bit intimidating, but many users may find it well worth the investment.




	Fujitsu DynaMO 640	Imation SuperDisk LS-120 2X	Iomega Jaz 2GB	Iomega Zip 100 USB
Connector	Ultra SCSI external (internal also available)	IDE internal (parallel and USB also available)	Ultra SCSI external (internal also available)	USB
OS supported	Win3x/95/98/NT Mac Unix	Win3x/95/98/NT Mac(USB only)	Win3x/95/98/NT DOS Mac	Win95/98 iMac
72MB single file write (minutes)*				
Windows 98	2:10	3:15	2:20	2:40
Windows NT	2:10	2:45	1:35	N/A
72MB directory write (minutes)*				
Windows 98	3:30	5:50	2:40	2:50
Windows NT	3:10	6:30	2:35	N/A
Contact	1-800-263-8716	1-888-326-7758	1-800-697-8833	1-800-697-8833
Web	www.fujitsu.ca	www.imation.com	www.iomega.com	www.iomega.com
Warranty	one year	one year	one year	one year
Price	$650 SRP	TBA	$569 ESP	$239 ESP
Estimated cost of media (each)	$60 (640MB)	$24.99 (120MB)	$179 (2GB)	$20 (100MB)

*averaged over three attempts

Overall




	Iomega Zip 250 Parallel	Panasonic SuperDisk LS-120 2X	Panasonic LF-5101 DVD-RAM	Summatec MultiDrive
Connector	parallel (SCSI also available)	IDE internal	SCSI internal	EIDE internal (parallel external also available)
OS supported	Win3x/95/98/NT DOS OS/2, Mac	Win3x/95/98/NT Mac(USB only)	Win95/98 Mac(third-party driver)	Win3.1/95/98/NT Mac(EIDE) other operating systems that can make use of IDE
72MB single file write (minutes)*				
Windows 98	7:05	3:15	2:45	0:30
Windows NT	8:50	2:45	N/A	0:45
72MB directory write (minutes)*				
Windows 98	7:20	5:50	5:20	0:32
Windows NT	7:20	6:30	N/A	1:00
Contact	1-800-697-8833	1-800-265-0618	1-800-265-0618	(760) 726-7607
Web	www.iomega.com	www.panasonic.ca	www.panasonic.ca	www.summatec.com
Warranty	one year	one year	one year	two years
Price	$319 ESP	$175 SRP	$1,149 SRP	US$149 SRP
Estimated cost of media (each)	$25 (250MB)	24.99 (120MB)	$59 (5.2GB) $39 (2.6GB)	US$249 (2GB) through US$399 (6GB)

*averaged over three attempts

EDITORS' CHOICE

Fujitsu DynaMO 640 SE

With magneto optical technology often prohibitively expensive, the DynaMO 640 SE is a refreshingly inexpensive model. With a great write speed and compatibility with a number of different platforms (plus the ability for instant device recognition without further configuration, no less), the DynaMO is a great way to bring higher end technology down to earth.

Sean Carruthers is Lab Test Editor for Canadian Computer Wholesaler. Based in Toronto, he can be reached at sean_carruthers@tcp.ca

You Can't Get Lost,

with ArcView GIS Business Mapping Tools

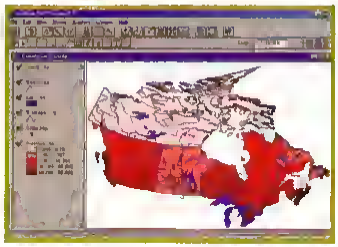
by John Hamm

Product: ArcView GIS
Vendor: Environmental Systems Research Institute (ESRI)
Phone: (416) 441-6035
Price: US$1,195
Rating: A

Savvy businesses have always been swift to adopt new computing technologies to increase their competitive advantage. From spreadsheets and word processors to desktop databases — users are always searching for better tools.

But business mapping products are often overlooked. ArcView GIS from Environmental Systems Research Institute (ESRI) is loaded with some of the best mapping tools on the market.

The product uses layers to display various map elements. One layer usually contains the base map, which is the outline of a province, city or other area of interest to your business. The next layer may contain streets or highways. Another layer has the location of stores or warehouses. Zoom out from your city to the country or to a map of the entire world. Zoom in to a postal zone, to a block or to a house.



Visualize Your Data

Every business accumulates information such as sales data, customer addresses, or sales by territory or region. At least 80 to 85 per cent of this data has a geographic component. ArcView GIS allows the user to access this data either from local database files or remotely from a network server. Most common data formats are supported, including dBase *dbf* files, ODBC including Microsoft Access, and of course Oracle, DB2 and SQL-based systems.

This data access allows the user to create layers that present astounding visual information. For example, unexpected pockets of density from the return of product registration forms could indicate valuable opportunities when the origin of the cards is superimposed over other layers.

A wide range of analytical functions provides even more functionality. Combined with demographic information, the above registration cards could be correlated with the prevailing income brackets of the areas in question, for better targeting and further analysis.

Excellent Documentation

The ArcView GIS package provides two books for programmers, including a complete reference manual to Avenue, the built-in programming language. A third book is a very good introduction, with easy-to-follow tutorials and color illustrations. Advanced topics are also covered and the on-line help system is superb. Good documentation is refreshing to see.

A Programmer's Dream

The entire ArcView GIS interface is written in the Avenue object-oriented scripting language that ships with the package. This makes it easy to customize interface elements, such as menu choices or toolbar buttons. If the primary purpose of information technology in business is to assist in the decision-making process, it makes sense to have custom interfaces to data designed by consultants or prepared internally.

Data Availability

ArcView GIS 3.1 ships with four CDs of map data, three of which provide detailed information about the United States. The fourth CD contains Canadian, Mexican, European and world data.

The Canadian data is very basic. The base map includes shoreline and province borders, population information by province, major roads, major lakes and rivers and major cities. Additional data is available for a price. Depending on the type of information required, prices vary radically. A retail business would probably want very detailed census information for each postal code in its sphere of operations. Such information is provided free by the government in the U.S., but must be purchased in Canada.

ESRI is a major supplier of data, including Canadian data, and a catalogue is included in the package. A search for "GIS" on the Internet will also locate several reputable data providers.

ArcView GIS is descended from ESRI's ArcInfo, a high-end GIS system used by governments, the military and *Fortune* 500 companies. Because of this, a considerable amount of data is becoming available on the Internet in ArcInfo format. This is good news for ArcView GIS users, as this data is easily imported.

Web Support

ESRI maintains a very useful Web site at *http://www.esri.com*, or go straight to *http://www.esri.com/software/arcview/index.html* for free utilities and add-ons, as well as user support and access to free data archives.

If you do business in the U.S., visit *http://www.esri.com/data/online/index.html* for complete U.S. census information, FEMA flood data, topographic data, and more than 14 million addressed street segments along with postal boundaries, landmarks and water features.

Upcoming Review: Watch for a review of the MapInfo Professional 5.0 business mapping package. CCW

John Hamm is a regular contributor to CCW. He is co-owner of Vancouver's Eastside DataGraphic, and can be contacted at harvest@bc.sympatico.ca.

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Reading Up on Windows 98?

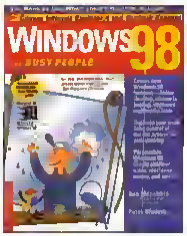
by Alan Ztsman

A new operating system always gives publishers the opportunity to deliver books meant to help users deal with the new system. Last summer's release of Microsoft's Windows 98 was no exception — we've been flooded with Windows 98 books aimed at users of all levels.

There are, however, a couple of problems. First, Windows 98, while in many ways a nice product, is nowhere near as revolutionary a change from its predecessor as Windows 95 was from earlier releases of Windows. Many users, upgrading from Win 95 may feel little need to replace the books they got at that time.

As well, there are all sorts of users with a variety of needs. No one book covers them all. In looking for a book on Windows 98, the reader needs to be clear on what his or her needs are, and spend some time looking for a book that meets those needs. Go with a specific question in mind, and see if you can find a book that answers it.

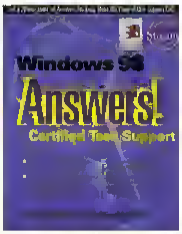
Here are some that stand out from the myriad:



Title: *Windows 98 for Busy People*
Authors: Ron Mansfield and Peter Wevarka
Publisher: Osborne McGraw Hill
Price: $34.99
Rating: A

This is a nicely written beginner's guide, designed to compete with the various *Dummies* and *Idiots* guides. Like others in the *Busy People* series, it is an attractive volume with full-color, somewhat trendy illustrations. There are good sections on setting up and customizing a new Windows 98 installation, and on working with Windows 98's Internet tools.

Personally, I'd rather be seen carrying a book that proclaims me "a busy person" than an "idiot" or a "dummy." Like those other successful series, this book is sprightly and lightly humorous. It takes beginning readers to what they want to know quickly, and is liberally sprinkled with screen shots that help illustrate what the user will be seeing on-screen.

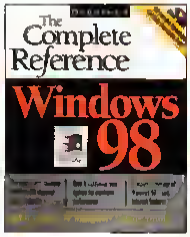


Title: *Windows 98 Answers! — Certified Tech Support*
Authors: Martin S Matthews and Carole Boggs Matthews
Publisher: Osborne McGraw Hill
Price: $34.99
Rating: B+

Also one of a series, this book uses a question-and-answer format, trying to anticipate most often-asked tech support questions, and then providing reasonably detailed answers to them.

As such, it is not the sort of book that most users will want to read from start to finish. Although there is a lot of information, much of it is presented more than once, as questions, inevitably, overlap. This isn't a criticism — for the right user, this can be a valuable volume. And its very first question would also be my very first one: *How can I select some components of Windows 98's Active Desktop while disabling the ones I don't want?*

Most organizations have a number of users who find themselves acting as informal tech support people for co-workers, neighbors, and friends. Because of its format, this book could prove a valuable resource for such a person, offering quick answers to the most commonly asked questions.



Title: *The Complete Reference Windows 98*
Authors: John Levine and Margaret Levine Young
Publisher: Osborne McGraw Hill
Price: $57.95
Rating: B

With nearly a thousand pages, this volume covers the same territory as the *Busy People* volume, but goes into its topics in more depth (though it lacks the former volume's attractive use of color). It offers more detail than the absolute beginner to Windows 98 will want to assimilate, but is more useful to many intermediate or power-user wannabees. For example, it includes helpful information on the several new and useful system accessories included with Windows 98, such as the System File Checker.

Sections on networking, securing a Windows 98 system, and fine-tuning system efficiency will prove valuable to many such users.

Despite its title, the volume is not complete. Readers seeking detailed information on, for example, the behind-the-scenes working of

the System Registry or User Policies will be disappointed. The book includes a CD-ROM containing the book's complete content as a series of HTML pages, complete with hyperlinks to relevant Internet sites.

Title: *Microsoft Windows 98 Resource Kit*
Publisher: Microsoft Press
Price: $100.99
Rating: B

With more than 1,500 pages of often turgid prose, this isn't a book meant to be read. Instead, it aims to be the definitive reference volume for Windows 98 professionals — people managing departments running a large number of Windows 98 systems, presumably networked together.

As a result, it is the place to go for information on topics such as creating customized installation scripts for upgrading or installation, or for learning about the capabilities of the Policy Editor *(Poledit.exe)* to limit users' abilities to mess with their systems.

A CD-ROM is included with a large number of utilities — again, the bulk of these will be of most interest to system administrators.

While this book is expensive, the entire content is available in the Windows Helpfile format on every copy of the Win98 CD (look for the file *rk98book.chm* in the *\tools\reskit\help* folder). As well, the Windows 98 CD includes a sampling of the Resource Kit's utilities.

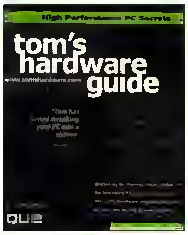
Also Check These Out

John Woram's *The Windows 98 Registry*, subtitles itself *A Survival Guide for Users*.

For many users, it may prove to be just that. Windows 95, NT, and now Windows 98 replace the host of *INI* files used in earlier versions with a single large system registry, compiling hardware, software, and user information into a single listing.

But the Registry seems like a scary black box to most users, understandably fearful to tamper with its innards. Woram's book offers background on the Registry's structure and contents, and tips to using it to tweak Windows 98's performance and solve problems. It's priced at $35.99 from MIS Press *(http://www.idgbooks.com)*. **Rating:** B.

And many readers of this column may have made use of Tom's Hardware Web site *(http://www.tomshardware.com)* — one of the key places on the Internet to keep up to date on the ever-changing computer technology. Independent of hardware manufacturers, Dr. Thomas Pabst (a medical doctor!) is averaging over a million hits per month, from people wanting the straight goods on CPUs, motherboards, and more.



Now, Dr. Tom's expertise is available in hard copy, and *Tom's Hardware Guide* promises "High-Performance PC Secrets," for $42.95.

Inevitably, it's lacking the up-to-the-minute-ness of the Web site, but it's a valuable volume nonetheless, with late-'98 state-of-the-art information on CPUs, chipsets, motherboards, BIOS, RAM, video and disk systems. Especially recommended are the sections on overclocking and on BIOS setup commands — two topics that tend to be poorly documented elsewhere. **Rating:** B+.

Alan Zisman is a regular CCW columnist. Residing in Vancouver, he is a computer journalist and teacher and can be reached at azisman@home.com.

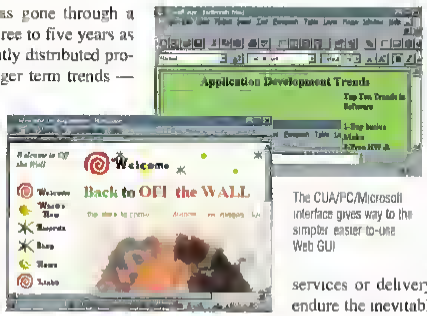
The Soft Trends in Development

• by Jacques Surveyer •

Application development has gone through a tectonic shift in the past three to five years as the Internet and consequently distributed processing has been layered over longer term trends — such as the continuing decline of hardware prices and packaged software costs

As a result there have been structural shifts in how all IT development is done, and 1998 was the watershed year when the dreaded Paradigm Shift became obvious.

Interestingly the Microsoft-DOJ antitrust case brings elements of many of these trends together the maturing of the industry huge consolidations, the importance of the Internet and the software industry's business practices



The CUA/PC/Microsoft interface gives way to the simpler easier-to-use Web GUI

Buy Buries Make

Buy has buried make for most IT shops. Only the most strategic of applications are built from scratch in-house. Increasingly, more stages of the software development process are being outsourced, if not the whole project. Annually, outsourcing is a US$300 billion industry, growing at more than 20 per cent (according to *Information Week*). And that growth is due to four factors: the increasing scarcity of IT people and consequent costs, the inherent complexity of client/server and n-tier processing, the woeful success record of IT shops on major projects, plus ever-shorter product cycles demanding ever-faster development of supporting systems. These and other factors have driven organizations to preferentially buy packaged services and solutions. For the astute VAR and reseller this spells *o-p-p-o-r-t-u-n-i-t-y*.

Free Hardware and Software!

Well, it might as well be free. CPU, memory, hard disk and communication bandwidth prices continue their free-fall. Software is following the commodity price trends downward, thanks to open sourcing, bundling and tough competition. The basic facts remain — a network with 100Mbps connections, a Pentium II 300MHz server with 256MB of RAM and a 20GB disk plus Windows NT with Corel Office, comes in at less than $6,000.

The Asian Flu will continue to pound hardware prices earthward while Linux, Apache and open source software will bring more price pressure. The result: people costs have become the number one IT development cost by factors approaching 10:1. The net result is that resellers who add value through support services or delivery of total solutions will be better positioned to endure the inevitable margin squeeze of commodity pricing.

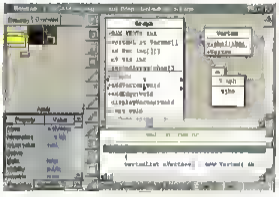
Top 10 Trends in Software

1. "Buy" buries "make."
2. Free hardware and software is here.
3. People costs dominate.
4. N-tier processing begins.
5. The Web interface wins.
6. Microsoft stumbles.
7. Consolidation grows.
8. Enterprise resource planning is the IT backbone for 2000.
9. Object-oriented components take off.
10. The Year 2000 problem is for real.

People Costs Dominate

People costs have always been major IT expenditures. But as late as the early 1980s, in many projects the hardware costs alone (just the raw CPU, memory, disk and networking hardware) comprised two thirds of a major system contract. Now, software development, installation and operations can see people costs absolutely dominating the total system price tag.

That's partly due to the drop in hardware and software prices. But another factor is the continuing shortage of qualified staff. This is not just a North American phenomenon, but is a worldwide problem. Asia and Latin America are foreseeing 15 to 25 per cent gaps between supply and demand. The situation is further worsened by the generation gap — developers and IT professionals over the age of 45 have a 15 to 20 per cent unemployment rate despite unprecedented demand in the market. Resellers who manage to skillfully reward consistent quality and loyalty in their IT workforce will be better positioned to prosper in the upcoming years.



A sample of reverse engineering of Java code into UML diagrams

N-tier Processing Begins

Any consultant will tell you the hardest development contracts are those involving n-tier processing — many client PCs, one or more application servers, plus one or more databases. The problems are obvious: mixed equipment and vendors, many more potential points of failure, and the sheer complexity of programming reliable systems and backup when the integrity of the system is spread over so many sources. But the trend in computing is decidedly towards distributed processing. The advent of the Internet, data warehousing plus supply-chain and other integrated systems signals the final charge of IT into the toughest areas of n-tier and distributed processing.

It took a Trojan Horse — the Internet — to trip off this move to distributed processing. The Internet's free WAN, standard open (truly cross-platform) access protocols, and the simplified GUI interface lured thousands of teams to deploy distributed systems. Intranet projects that solved critical need-to-know information systems cropped up everywhere. Many of these systems were completed in dramatically short time frames because standard components and methods (HTML, CGI, IP, Java or JavaScript) were used. Also, many of the systems were read-only — the much more challenging problem of updating data on a distributed basis is only now being addressed.

Internet and n-tier development in 1998 went mainstream. All major ERP vendors adopted it and thus prepackaged n-tier systems became the norm. New Web and application servers from all the major vendors are designed to build n-tier systems. And Microsoft embraced n-tier system design in its 1998/1999 product lines — Visual Studio, SQL Server 7 and Windows 2000 with free versions of MTS-Microsoft Transaction Server and MSMQ-Microsoft Message Queuing Services.

Of course, anybody developing Web sites and services is engaged in n-tier system design, no matter how simple the application because there are at least three tiers involved in the processing: client PCs, Web server, and the data/Web page source. Hence, VARs and resellers who have stayed current with Web development techniques will be very well rewarded over the next three to five years.

The Web Interface Wins

The Web GUI is winning over the classic CUA/PC/Microsoft windowing interface. This is a fundamental shift away from the complexity/bloatware face that PC systems now offer, to the simplicity of Web GUI designs. One of the biggest selling points of Web systems is that they are so simple and intuitive to learn. This is because each page contains only the controls needed for navigation and use, while PC programs carry the control and menus for often dozens of potential views that may appear on the front page. This is biased towards the sophisticated or power user at the expense of new or casual users. The more complex CUA/PC interface takes longer to learn and more help desk support. But the clincher for Web GUIs is: they are easier and faster to develop and are guaranteed (with proper precautions) to run on any platform.

Microsoft Stumbles

Last May, a Software Publishers Association paper condemned Microsoft practices, saying one of its own members is consistently using predatory and anti-competitive practices. Companies have been publicly alleging that Microsoft is embedding routines in its operating system software to squash the performance of competing products. As the Department of Justice, Sun, Caldera and others sue, the spotlight shines very brightly on every aspect of Microsoft's business practices.

Microsoft will act very aggressively to extend its PC desktop operating system and office suite dominance over to the server and back office side of systems. Innovation is fine just so long as it does

not threaten Microsoft's market position in any way. That, of course, is increasingly harder to avoid.

Depending on who does the counting, there's between US$8 trillion and US$10 trillion invested in legacy systems, while PC systems own between US$1 trillion and US$3 trillion. The key, given the scarcity of resources, is not replacing but unlocking and creatively interfacing to such legacy systems.

Computing Industry Consolidation

As computing becomes larger and more standardized, the big companies got bigger. In 1998, some big mergers and acquisitions occurred. Compaq/Digital, Nortel/Bay, Netscape/Kiva, Sun/Net Dynamics, MCI/Worldcom and AOL/Netscape are just a few. At the recent Microsoft Developers Conference, vice-president David Vaskevitch listed 12 major computing problems and all except distributed computing were well on their way to being solved. The inevitable result is a slowdown in growth and innovation. It also can be seen in the emergence of big blocks — 10 companies dominate the consulting and outsourcing market and five companies dominate the increasingly important ERP market, according to AMR Research. And industry estimates say just six firms take nearly 70 per cent of all worldwide software revenues and more than 80 per cent of the profits.

As we have already seen, resellers and consultants already have to contend with tighter margins and commodity pricing. That task is ever more challenging, as contenders need to thrive relative to some very big players.

ERP Is the IT Backbone 2000

The leading vendors, including SAP, Baan, Oracle, Peoplesoft and J D Edwards, are growing at an imposing average rate of about 40 to 50 per cent per quarter. By 2002, the total ERP market is estimated to be $50 billion, according to research published in *ComputerWorld*. Analysts concede ERP is not just a Year 2000 phenomenon, and the trend to buy rather than build will continue well into the next decade. That's thanks to better software integration across subsidiaries and regional operations, reduced risk of project failure, and shorter delivery time. ERP vendors offer extensive customization at installation, open APIs, development tools, Web and other middleware interfaces to reduce the complaints of "forced fit," and "isolated islands" and software offerings.

The bottom line. As of 1998 year-end, 70 per cent of *Fortune* 1,000 companies were reportedly using ERP systems as the backbone of their financial, human resources, manufacturing, distribution and/or other mission-critical systems.

By the year 2002, ERP systems will provide the IT backbone for 90 per cent of the *Wilshire* 5,000 top companies. In sum, development is moving away from in-house, proprietary systems towards assembling and customizing pre-built system architectures as supplied by the major ERP vendors. In effect, ERP vendors will be setting the standards for data processing for most organizations.

Object-Oriented Technology and Components Take Off

Many consultants and resellers already use object-oriented and component technology. Any usage of ActiveX, JavaBeans, MFC frameworks, CORBA middleware, code generators and other application development wizards means taking advantage of components and/or object-oriented technology. Like the Year 2000 problem, the pattern of usage is so pervasive it is hard to quantify. But the drivers toward object-oriented and component technology are obvious. Code re-use fostered by these methods offers four compelling advantages: faster development and system delivery time, more reliable code and systems, lower cost for development, and easier changes and enhancements using techniques such as inheritance and polymorphism. New object-oriented CASE design tools support both forward engineering (changing UML diagrams directly into C++ or Java code, for example) and reverse engineering (from existing C++, Java or other object-oriented language source automatically derives the appropriate UML diagrams). In fact, object-oriented technology is dominating every aspect of Web and application system development.

The Risks of Year 2000 are for Real

Year 2000 is a Godzilla problem — it's a case where size does matter. The date changes required are not rocket science, in fact they are trivial. But like computing itself, this is absolutely pervasive. Even firms that have spent hundreds of millions of dollars on Year 2000 remediation find that they are still vulnerable because their customers and suppliers cannot handle the Year 2000 problems as gracefully.

As a world society we have become dependent on the continued operation of embedded, stand-alone and networked computing devices. The bill falls due Jan. 1, 2000. At no time has that old Scout's motto rung so true — *Be Prepared*.

Jacques Surveyer is a systems consultant living in Toronto. His Web site is at http://www.inforamp.net/~jbsurv, and he can be reached at www.inforamp.net/~jbsurv. What do you see as the major trends in application development? All reader comments will receive prompt replies.

Alan Zisman

Pentium III is more like Pentium 2.1

It's the end of the road for the Pentium II series. Intel has announced the Pentium III, which should be shipping as you read this. But don't expect anywhere near as traumatic a transition as last time round. In fact, the new product line probably isn't deserving of such a dramatic renaming.

The History

The changeover from Intel's original Pentium to its next-generation Pentium II models was a big one — one that in many ways, the industry still hasn't completed. In bringing out the Pentium II design, Intel tried to push the industry to adopt the company's proprietary Slot One design — putting the processor, its cache RAM, and its support chips onto a large cartridge. Even Intel's low-end model, the Celeron, adhered to the Slot One standard, requiring all-new motherboard designs.

While Intel abandoned the Pentium (and Pentium-MMX) Socket 7 design, it remains in use by Intel's competitors. One of those competing Socket 7 CPUs — AMD's K6 model line, powered the most computers sold at retail last year, out-selling any of Intel's models in that market.

Pentium II designs also came with Accelerated Graphics Port (AGP) video, though that's now available on a few high-end Socket 7 boards. And most recently, the system bus has been pushed up from 66MHz to 100MHz.

The Pentium III is more like a Pentium 2.1 upgrade. Unlike the drastic design changes necessitated to handle the Pentium II, the new models are slot-compatible. They will continue to use the Intel 440BX motherboard chipsets used by the current generation of Pentium II designs. (Users wanting to upgrade current Pentium II systems will need to upgrade their system BIOS, however, so don't expect to simply pop a new Pentium III into an existing Pentium II computer.) CPU speeds will at least initially not be much, if any, faster than high-end Pentium IIs, with 450MHz and 500MHz Pentium III models replacing 400MHz and 450MHz Pentium IIs — continuing to run on a 100MHz system bus.

In fact, there will be only one major difference between a 450MHz Pentium II and a 450MHz Pentium III. The newer CPU includes what Intel formerly code-named the Katmai New Instruction Set — a collection of 70 new low-level processor instructions, designed to improve multimedia performance and more. Katmai is targeted at voice recognition, streaming video and improved floating point computation.

Sounds like MMX, doesn't it? MMX, appearing in early 1997, was also a group of new processor instructions, aiming at bettering multimedia performance. MMX was first added to Pentium-level processors. Compatible instruction sets soon appeared in most of the Pentium-clone processors as well. In retrospect, MMX was less than a revolution, and its performance improvements were more promise than reality.

The problem was: software had to be specifically coded to take advantage of MMX features, and with a few exceptions, not much was. Even game companies have been more likely to produce versions optimized for various 3D add-on cards than to write MMX-specific versions.

Will the same fate await the Katmai instructions? We'll have to wait and see. Microsoft has promised to build support for Katmai into its upcoming Windows 2000 operating system.

Intel's competitors seem self-confident enough to go their own route — a non-compatible set of new processor instructions being called 3D Now.

Pentium III based systems will rapidly become available, mostly because they require such minor changes from existing systems. And the Pentium III is clearly the direction that Intel foresees for mainstream systems at least for the next little while. Greg Welch, Intel's brand manager for the Pentium III, claims that with the Pentium III's release, there will be no new versions of its predecessor.

Expect design changes in the future to support upcoming, faster Pentium III models. Ming Chok, vice-president of motherboard manufacturer Soyo, suggests we can look forward to a 133MHz bus speed later in 1999, requiring new chipsets. There will also be a sped-up 4X version of AGP again requiring system revisions. CPU speeds should reach 600MHz by late this year.

At the same time, Intel plans to revise and simplify the Slot One design for Pentium IIIs towards the end of the year, according to Paul Otellini, executive vice-president of the Intel architecture business group. All these changes will mean that later Pentium III models will no longer be compatible with current systems — but the pace of change will be more gradual than we've seen in the recent past.

In fact, Otellini suggested Intel is hoping that system designs and motherboard chipsets will last over two generations of processors — responding to complaints from manufacturers forced to change their product lines too quickly.

Ironically, while Intel is trying to slow the sometimes frantic pace of change, competitor AMD, which has been successfully building more and more powerful processors compatible with the older Socket 7 designs, is trying to achieve a dramatic break with its past. While its new and improved 450MHz K6-3 remains a Socket 7 model, it appears to be the end of that evolutionary pathway. The upcoming K7 series will use a Slot One-like technology to run at 500MHz and above, with the company aiming for speeds as high as 1,000MHz sometime in the year 2000 as the company switches from aluminum to copper technology. The initial K7s, announced last October and due mid-1999, are expected to run on an innovative 200MHz system bus, built using Digital's advanced Alpha EV6 bus technology. While this will certainly provide real performance improvements, the pressure will be on AMD to convince system manufacturers to build motherboards and systems based on it.

Intel and AMD may be switching roles, with Intel offering systems only slowly evolving from current standards while promising only modest performance improvements. AMD, on the other hand, is taking over Intel's traditional role of promising dramatic performance improvements to manufacturers willing to make an equally dramatic break with current designs. CW

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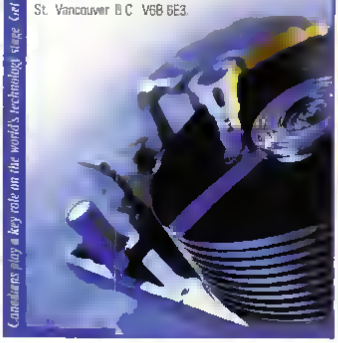

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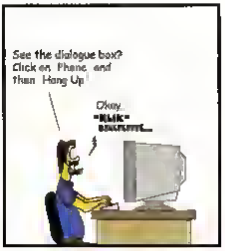

Reader Poll

VOICE YOUR OPINION

Our Question to You:
Megapixel cameras have greatly increased their resolution while prices continue to drop In 1999 which most closely matches your opinion?

- ☐ Sales of digital cameras will skyrocket as more people take advantage of their quality
- ☐ There will be some increase in digital camera sales this year
- ☐ The majority of sales will be to current digital camera users wanting to upgrade to the high-resolution models
- ☐ Serious market adoption of digital cameras won't happen until after this year

Last Issue, We Asked:
Bill C32, instituted Jan 1, may dramatically increase the costs of CD-recordable media as it requires a tax of up to 50 cents per 15 minutes of digital recording time on blank CDs See *http://www.tcp.ca/gsh/reviews/storage/cdr-Q199.html* With the proposed levy potentially adding $2.50 to the price of blank CD media, how would this impact the CD-R market?

You Said:
20% This levy would have little effect on sales
60% This levy would slow sales but the media would persevere
8% The market would abandon the media and move to CD RW
13% The market would abandon CD technology altogether and move to other removable storage options

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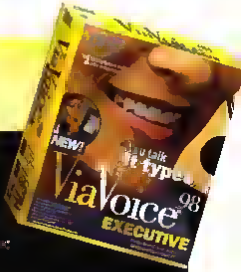

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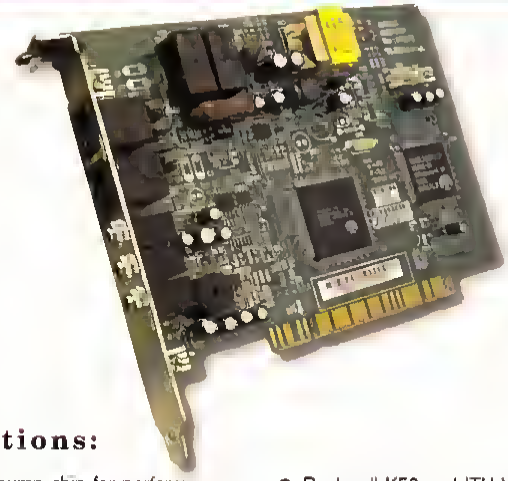

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